

The effectiveness of vaccination against COVID-19-related fear and psychological resilience perception

The effectiveness of vaccination against COVID-19-related fear

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Abstract

Aim: In this study, it was aimed to evaluate the relationship between COVID-19-related psychological resilience perception and fear of COVID-19 before and after vaccination using the Fear of COVID-19 Scale.

Material and Methods: The study included 830 participants aged from 18 to 89 years both before and after vaccination. Participants were administered a survey that included sociodemographic data, the COVID-19 Fear scale and the Fear of COVID-19 as well as questions related to psychological resilience perception.

Results: As a result of the study, it was found that the participants' rates of watching the news every evening, following the number of cases on a daily basis, following social media accounts, buying masks/gloves/disinfectant increased after the vaccination. While the fear levels in females and males were similar before vaccination, the fear levels of females after vaccination were found to be higher.

Discussion: It was found that while the fear levels of females and males were similar before vaccination, the fear levels in females were found to be higher than in males after vaccination. In other studies, in which fear levels were examined without making any distinction between before and after vaccination in the pandemic process, fear levels of females were found to be higher than those of males. This can be explained by the fact that females have lower psychological resilience and the risk factor of being a female in terms of various mental disorders.

Keywords

COVID-19, Pandemic, Fear

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Introduction

COVID-19 emerged in Wuhan city of China in December 2019 [1]. The infection was declared to be a pandemic by the World Health Organization (WHO) in March 2020 (available: <https://www.who.int/europe/emergencies/situations/covid-19>). COVID-19 is an infectious disease that causes acute respiratory tract infection [2]. According to the report released by WHO on 6 April 2023, there were 762,202,069 confirmed cases and 6,893,190 deaths across the world. In Turkey, where the first case was reported on 11 March 2020, as of 6 April 2023, there were 17,004,677 confirmed cases and 101,419 deaths (available: <https://covid19.who.int/region/euro/country/tr>).

COVID-19 has had social, health-related, and economic repercussions in a wide area worldwide. Governments and public health made social isolation, staying at home, and quarantine compulsory [3]. The COVID-19 pandemic has directly and indirectly affected the mental health of individuals [4]. The pandemic has led to various mental disorders in individuals such as anxiety, stress, and fear [5].

The COVID-19 infection has affected individuals mentally, socially, and economically. Restrictions and the spreading speed of the infection have led to the development of fear of getting infected, worry about the future, and anxiety. In the study, it was aimed to evaluate the relationship between the fear of COVID-19 before and after vaccination through the Fear of COVID-19 Scale.

Material and Methods

After breceiving information about the study and obtaining personal consent, 830 individuals at age of 18 years and above who applied to Selcuk University Medical Faculty COVID-19 Vaccination Unit between August and October 2021, who did not have uncontrolled epilepsy, who have not been vaccinated with live vaccine, who have not been tested for tuberculosis in the last month, and who have not tested positive for COVID-19 in the last three months, were administered personal information form consisting of 20 questions about socio-demographic characteristics, 6-item psychological resilience form, and 7-item Fear of COVID-19 Scale through face-to-face interview technique. In order to identify the effectiveness of the vaccination, the Fear of COVID-19 Scale and questions on psychological resilience were repeated before and after the study.

Approval for scientific research to be conducted in Selcuk University Medical Faculty Hospital COVID-19 Vaccination Unit was taken (Decision no: 2021/418), and ethical approval was obtained from the ethics committee (27.08.2021-E121723).

Socio-demographic Information Form

The form developed by the researchers for use in the study consisted of 20 questions inquiring about the socio-demographic characteristics of the participants such as age, gender, education status, occupation, marital status, smoking status, alcohol consumption, chronic diseases, COVID-19 history, contact with a COVID-19 infected patient, PPD test history in the last month, getting vaccinated in the last two weeks, side effects experienced in previous vaccinations, presence of neurological diseases, receiving vitamin and mineral support, presence of a known allergy, and pregnancy and breastfeeding status.

Fear of COVID-19 Scale

The scale was developed by Ahorsu et al [6] to measure COVID-19-related fear levels of individuals. The Turkish validity and reliability study of the scale was conducted by Satici et al [7]. The 7-item 5-point Likert type scale (1=Strongly Disagree, 5=Strongly Agree) has a one-factor structure. Internal consistency of the scale was found to be 0.82, and the test-retest reliability was calculated as 0.72. A high score on the scale shows a high level of fear of COVID-19.

Questions Regarding Psychological Resilience Perception

Six questions regarding psychological resilience prepared and used by Yazici Celebi [8] in his study investigating reactions to the COVID-19 pandemic in terms of psychological resilience were included in the study by taking permission from the author. These questions are:

- I watch the news on COVID-19 (coronavirus) every evening.
- I follow the number of cases on a daily basis.
- Due to COVID-19, I started to follow the social media accounts of the Ministry of Health.
- I bought masks, gloves/disinfectants due to COVID-19.
- My sleep pattern got disrupted because of the pandemic-related anxiety.
- From time to time, I find myself examining whether I display any COVID-19 symptoms.

Statistical analysis

All statistical analysis was performed using R (available: <https://www.r-project.org>). Tests of normality assumptions for individual items were examined with skewness and kurtosis. Tests of skewness and kurtosis are within the adequate range of $\leq |3|$. Also, tests of normality assumptions for variables were checked with Shapiro-Wilk normality tests. The internal consistency reliability was evaluated using McDonald's w coefficients. The validity of the scale was evaluated with confirmatory factor analysis. A Mixed-ANOVA was conducted to determine the effect of different demographical variables (gender, education, marital status, smoking, alcohol consumption, etc.) over time (before and after the vaccination) of vaccinations on the COVID-19 fear scale score. Two-proportions Z-test was used to determine whether there was a statistically significant change between before and after the vaccination in the attitudes of the participants toward the COVID-19 fear.

Ethical Approval

Ethics Committee approval for the study was obtained.

Results

Table 1 presents the demographical, reliability and validity statistics for the COVID-19 fear scale both before and after the vaccination. The item-total correlations for individual items were above 0.35. The average interitem correlation of the scale was 0.616 and 0.573 before and after the vaccination, respectively. The McDonald's w values for the COVID-19 fear scale were 0.921 before and 0.892 after the vaccination. All items had standardized factor loadings above 0.50, representing "fair" to "excellent".

The factor structure of the scales was verified using CFA. The results were assessed based on data-model fit statistics and their cut-off scores: RMSEA and SRMR values, CFI and TLI. The results of CFA for each of the scales were CFI=0.989, TLI=0.967,

SRMR=0.020, and RMSEA=0.092 for fear. This indicates a satisfactory model fit.

The descriptive statistics of the socio-demographical characteristics of the participants both before and after vaccination are presented in Table 2.

There were no statistically significant two-way interactions between gender and time of vaccination, $F_{1,828}=2.043$, $p=.153$. Considering the adjusted p-value, it can be seen that the simple main effect of gender was not significant before the vaccination ($p=.282$). It becomes significant after the vaccination ($p=.010$). The mean COVID-19 fear score was significantly higher in females compared to males after the vaccination ($p=.005$) but not before the vaccination ($p=.141$). There was a statistically significant main effect of time of vaccination both in females and males ($F_{1,462}=346.5$, $p<.001$ and $F_{1,366}=182.5$, $p<.001$). There was a significant decrease in COVID-19 fear score after the vaccination both in females and males (all $p<.001$) (Figure 1-A).

There was a statistically significant two-way interaction between education and time of vaccination, $F_{4,825}=8.759$, $p<.001$. Considering the adjusted p-value, it can be seen that the simple main effect of education was significant before the vaccination ($p=.006$) and after the vaccination ($p=.001$). The mean COVID-19 fear score was significantly higher in primary school graduates than in illiterate participants before the vaccination ($p=.001$). The mean COVID-19 fear score was lower in literate (1.75 ± 0.67) participants compared to primary school graduates (2.33 ± 0.91 , $p=.010$), high school (2.24 ± 1.10 , $p=.007$) and university (2.20 ± 1.06 , $p=.015$) graduates after the vaccination. There was a statistically significant main effect of time of vaccination in all education levels (all $p<.001$). There was a significant decrease in COVID-19 fear scores after the vaccination in all education levels (all $p<.001$) (Figure 1-B). There were no statistically significant two-way interactions between marital status and time of vaccination, $F_{1,828}=0.426$, $p=.514$. Considering the adjusted p-value, it can be seen that the simple main effect of marital status was significant before the vaccination ($p=.008$) and after the vaccination ($p=.005$). The mean COVID-19 fear score was significantly higher in married compared to single both before ($p=.008$) and after the vaccination ($p=.005$). There was a statistically significant main effect of time of vaccination in both married and single ($F_{1,409}=236.2$, $p<.001$ and $F_{1,419}=256.2$, $p<.001$) participants. There was a significant decrease in COVID-19 fear score after the vaccination in both married and single participants (all $p<.001$) (Figure 1-C).

There was a statistically significant two-way interaction between alcohol and time of vaccination, $F_{1,828}=18.576$, $p<.001$. Considering the adjusted p-value, it can be seen that the simple main effect of alcohol was significant before the vaccination ($p=.006$), but not after the vaccination ($p=.922$). The mean COVID-19 fear score was significantly higher in consumption of alcohol compared to no consumption of alcohol before the vaccination ($p=.002$) but not a after the vaccination ($p=.461$). There was a statistically significant main effect of time of vaccination both in alcohol and non-alcohol ($F_{1,189}=105.6$, $p<.001$ and $F_{1,639}=439.1$, $p<.001$). There was a significant decrease in COVID-19 fear score after the vaccination both in

alcohol and non-alcohol (all $p<.001$) (Figure 1-D).

Following the vaccination, the participants' rates of watching the news every night, following the number of cases on a daily basis, following social media accounts, buying mask/gloves/disinfectant, and disrupted sleeping patterns statistically significantly increased, while their rate of thinking that they displayed COVID-19 symptoms decreased (Table 3).

Table 1. Descriptive statistics, reliability and validity of the COVID-19 fear scale.

Item	M	SD	r_{it}	w_{iid}	α_3	α_4	Std. loading
I am most afraid of COVID-19							
Before	3.11	2.62	0.780	0.905	-0.179	-1.573	0.869
After	2.26	2.31	0.706	0.871	0.668	-0.775	
It makes me uncomfortable to think about COVID-19							
Before	3.15	1.61	0.779	0.906	-0.208	-1.554	0.889
After	2.35	1.32	0.715	0.871	0.587	-0.885	
My hands become clammy when I think about COVID-19							
Before	2.12	1.38	0.703	0.915	0.885	-0.513	0.630
After	1.78	1.13	0.685	0.879	1.332	0.864	
I am afraid of losing my life because of COVID-19							
Before	3.30	1.70	0.771	0.906	-0.313	-1.599	0.901
After	2.79	1.67	0.710	0.874	0.212	-1.639	
When watching news and stories about COVID-19 on social media, I become nervous or anxious							
Before	3.14	1.659	0.802	0.903	-0.182	-1.601	0.840
After	2.51	1.50	0.675	0.878	0.447	-1.285	
I cannot sleep because I'm worrying about getting COVID-19							
Before	1.99	1.38	0.636	0.919	1.021	-0.419	0.531
After	1.70	1.9	0.616	0.883	1.399	0.888	
My heart is pounding or racing when I think about getting COVID-19							
Before	2.16	1.44	0.767	0.910	0.889	-0.594	0.688
After	1.78	1.21	0.730	0.874	1.469	1.132	
The Fear of COVID-19 Scale score							
Before	2.71	1.27	0.616	0.921	0.065	-1.308	
After	2.17	1.3	0.573	0.892	0.573	-0.571	

M: mean, SD: standard deviation, rit: item-total correlation, wiid: McDonald's w coefficients if item deleted, α_3 : Skewness, α_4 : kurtosis, Std. loading: standardized regression coefficients (factor loadings) in confirmatory factor analysis.

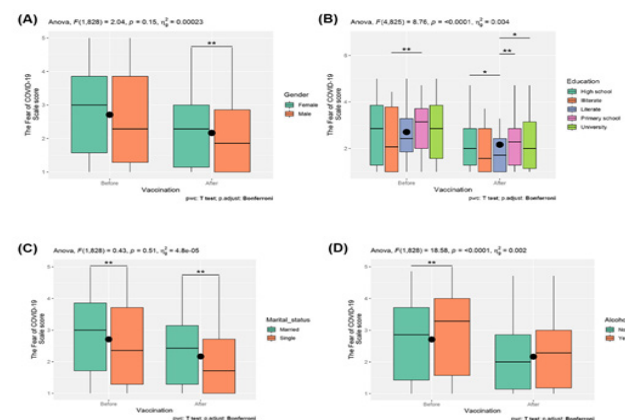


Figure 1. (A) The box plots of the COVID-19 Fear scale stratified by gender both before and after vaccination. (B) The box plots of the COVID-19 Fear scale stratified by education both before and after vaccination. (C) The box plots of the COVID-19 Fear scale stratified by marital status both before and after vaccination. (D) The box plots of the COVID-19 Fear scale stratified by alcohol use both before and after vaccination.

Table 2. Descriptive statistics of the socio-demographical characteristics of the participants both before and after vaccination.

	Before vaccination	After vaccination
Gender		
Female (n=463)	2.77 ± 1.22	2.25 ± 1.05
Male (n=367)	2.64 ± 1.32	2.05 ± 1.00
Education		
Illiterate (n=70)	2.27 ± 1.31	1.90 ± 0.97
Literate (n=61)	2.71 ± 1.26	1.75 ± 0.67
Primary school (n=91)	3.04 ± 1.04	2.33 ± 0.91
High school (n=203)	2.71 ± 1.34	2.24 ± 1.10
University (n=405)	2.71 ± 1.25	2.20 ± 1.06
Marital status		
Married (n=410)	2.83 ± 1.25	2.27 ± 0.94
Single (n=420)	2.59 ± 1.28	2.07 ± 1.11
Smoking		
Yes (n=330)	2.82 ± 1.28	2.26 ± 1.05
No (n=500)	2.64 ± 1.25	2.10 ± 1.02
Alcohol		
Yes (n=190)	2.95 ± 1.36	2.21 ± 1.08
No (n=640)	2.64 ± 1.23	2.15 ± 1.02
COVID-19		
Yes (n=295)	2.69 ± 1.28	2.27 ± 1.13
No (n=535)	2.72 ± 1.26	2.11 ± 0.97
Having the COVID-19 infection in the last six months		
Yes (n=131)	2.68 ± 1.07	2.25 ± 1.00
No (n=699)	2.71 ± 1.30	2.15 ± 1.04
Vitamin mineral		
Yes (n=165)	2.88 ± 1.28	2.11 ± 0.90
No (n=665)	2.67 ± 1.26	2.18 ± 1.06
Allergy		
No (n=587)	2.70 ± 1.29	2.14 ± 1.04
Food (n=62)	3.28 ± 1.10	2.80 ± 0.95
Drug (n=116)	2.49 ± 1.23	2.09 ± 1.02
Seasonal (n=65)	2.63 ± 1.14	1.89 ± 0.79
Pregnancy		
Yes (n=18)	3.31 ± 1.31	2.61 ± 0.96
No (n=812)	2.70 ± 1.26	2.16 ± 1.03

Table 3. Comparison between psychological resilience perceptions before and after vaccination.

	Before	After	p-value
I watch the news on COVID-19 (coronavirus) every evening.	11 (1.3)	468 (56.4)	<.001
I follow the number of cases on a daily basis.	10 (1.2)	494 (59.5)	<.001
Due to COVID-19, I started to follow social media accounts of the Ministry of Health	506 (61)	571 (68.8)	<.001
I bought mask, gloves/disinfectant due to COVID-19.	80 (9.6)	127 (15.3)	<.001
My sleep pattern got disrupted because of the pandemic related anxiety	688 (82.9)	738 (88.9)	<.001
From time to time, I find myself examining whether I display any COVID-19 symptoms.	345 (41.6)	7 (0.8)	<.001

Discussion

The participants' rates of watching the news every evening, following the number of cases on a daily basis, and following social media accounts after vaccination were found to be high. This situation may suggest that the participants of the study have reached a more conscious point in terms of the pandemic. It was determined that the participants' rate of buying mask/gloves/disinfectant statistically significantly increased. In a study conducted, the use of personal protective equipment was also found to be high [9].

It was determined that the participants' rate of disrupted sleep patterns statistically significantly increased after vaccination. This situation can be attributed to the fact that the time allocated for sleep indirectly decreased as a result of the increase in the participants' rates of watching the news every evening, following the number of cases on a daily basis, and following social media accounts after vaccination. In addition, working from home, staying at home, and curfews may have affected individuals' routine sleep durations. Fast spread of the infection and high mortality rate might have affected individuals' stress levels and disrupted their sleeping patterns. Besides, in the study conducted by Kirac et al., the anxiety related to being infected with COVID-19 positively affected postponing sleep. It was also concluded that females had higher anxiety and postponed sleep [10].

It was found that while there was an increase in the individuals' rate of thinking that they were showing COVID-19 symptoms before vaccination, this rate decreased after vaccination. The participants stated that they believed in the protective effect of the vaccine. This situation was considered to be related with not checking the symptoms after vaccination. Moreover, in the study conducted by Yazici Celebi, it was determined that when asking if they were showing symptoms, females compared to males and married individuals compared to single individuals checked the symptoms at a higher rate [8].

It was found that while the fear levels of females and males were similar before vaccination, the fear levels of females were found to be higher than males after vaccination. No study was encountered in the literature that examined the effect of the vaccine on fear levels of females and males. In other studies, in which fear levels were examined without making any distinction between before and after vaccination in the pandemic process, fear levels of females were found to be higher than those of males. This can be attributed to females having lower psychological resilience and the risk factor of being a female in terms of various mental disorders. In the study conducted by Pak Gure, the fear of being infected with COVID-19 was found to be higher in females [11]. Kimter found that psychological resilience level of males was significantly higher than that of females [12]. In the study conducted by Erdogan Yuce et al., stress level of females was determined to be higher compared to that of males [13]. In the study by Tonbul, gender factor was found to have positively affected psychological resilience [14]. In various studies conducted, females were found to have higher levels of fear of being infected with COVID-19 in comparison to males [15-17].

In the present study, fear levels of married individuals after vaccination displayed a relative decrease, but it was not

statistically significant. Similarly, the fear levels of single individuals displayed a relative decrease after vaccination compared to the level before vaccination, but the decrease was not statistically significant. However, the fear levels of married participants were statistically significantly higher both before and after vaccination compared to the fear levels of single participants. This high level of fear among married individuals can be attributed to higher family responsibilities and the presence of children increasing their fear level. On the other hand, in the study conducted by Bayulgen et al., no significant difference was found in the pandemic process between marital status and anxiety score [18]. In the study they conducted, Aydin et al. could not find a difference between marital status and having a child in scale scores [19].

In many of the studies that have been conducted, levels of fear have been reduced with higher levels of education, but in the present study, we did not find such a result, which could have been affected by social media use, information provided by the Ministry of Health on television, and rates of watching the news. In the study conducted by Arapcioglu et al., the fear of being infected with COVID-19 was found to be higher in nurses compared to doctors [20]. In the study they conducted, Doshi et al. found higher levels of fear of being infected with COVID-19 in individuals with low level of education [21]. Arisoy et al. found that as education level decreased, the fear of being infected with COVID-19 increased [17]. In the study conducted by Huang et al., no significant difference was found between educational status and anxiety [22]. Memis Dogan et al. found low anxiety levels among university graduates during the pandemic period [23]. In the study by Pak Gure et al., it was concluded that the fear of being infected with COVID-19 increased in individuals with high levels of education [11]. In the study conducted by Bozdog, it was determined that as education level increased and precautions were taken against COVID-19, psychological resilience level increased [24]. In all these studies, the effect of education level in the period when the studies were conducted independently of the effect of vaccination was evaluated.

Uncertainty about the effect of alcohol on COVID-19 before vaccination may have elevated fear levels in individuals. It can be stated that this situation may have decreased the fear of being infected with COVID-19 in alcohol consumers after vaccination along with the trust in the vaccine.

As all parameters in the present study were evaluated in a general sense throughout the pandemic process and the distinction between before and after vaccination was not encountered in the literature with a few exceptions, the data in this regard were limited. Being one of the few studies in the literature in this regard and the wide population of the study contributed to the value of the study.

Conclusion

Vaccination is the most effective and easiest protective health service that can be provided to save the lives of millions of individuals. Through vaccination, we can contribute to preventable COVID-19 infection related mortality and morbidity as well as the fear cause by the infection and psychological resilience.

Scientific Responsibility Statement

The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and human rights statement

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

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Conflict of interest

The authors declare no conflict of interest.

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